529 Rec'd PCT/PTO 11 OCT 2000

FORM PTO-1390 (Modified) (REV 5-93) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: 077680/0114

U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5): Unassigned 09/673135

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/DE99/01078	April 9, 1999	April 11, 1998

TITLE OF INVENTION
PULLEY

APPLICANT(S) FOR DO/EO/US
Georg BURKHARDT, Bruno KAECHELE

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   - ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   - ☒ has been transmitted by the International Bureau.
   - ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   - ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   - ☐ have been transmitted by the International Bureau.
   - ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   - ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information: German Language Declaration (3 pages); Verified Statement Claiming Small Entity Status (2 pages)

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U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NUMBER
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17. ☒ The following fees are submitted:	CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5): Search Report has been prepared by the EPO or JPO $860.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) $690.00		
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2) $710.00		
Neither international preliminary examination fee (37 CFR 1.482) nor International search fee (37 CFR 1.445(a)(2)) paid to USPTO $1,000.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) $100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$860.00	
Surcharge of $130.00 for furnishing the oath or declaration later than 20 Months from the earliest claimed priority date (37 CFR 1.492(e))		

Claims	Number Filed		Included in Basic Fee		Extra Claims		Rate		
Total Claims	38	-	20	=	18	×	$18.00	$324.00	
Independent Claims	1	-	3	=	0	×	$80.00	$0.00	
Multiple dependent claim(s) (if applicable)							$270.00		
TOTAL OF ABOVE CALCULATIONS =								$1184.00	
Reduction by ½ for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28).								$592.00	
SUBTOTAL =								$592.00	
Processing fee of $130.00 for furnishing English translation later the 20 months from the earliest claimed priority date (37 CFR 1.492(f). +									
TOTAL NATIONAL FEE =								$592.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property +								$40.00	
TOTAL FEES ENCLOSED =								$632.00	
							Amount to be: refunded	$	
							charged	$	

a. ☒ A check in the amount of $632.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. 19-0741 in the amount of $0.00 to the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 19-0741. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Foley & Lardner
Washington Harbour
3000 K Street, N.W., Suite 500
Washington, D.C. 20007-5109

SIGNATURE

NAME Richard L. Schwaab

REGISTRATION NUMBER 25,479

Applicant or Patentee: **Georg BURKHARDT et al.**
Serial or Patent No.: **PCT/DE99/01078** Atty. Dkt. No. **077680/0114**
Filed or Issued:
For: **PULLEY**

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS
(37 CFR 1.9(f) AND 1.27 (c)) — SMALL BUSINESS CONCERN

I hereby declare that I am

( ) the owner of the small business concern identified below:
( ) an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN: **WILHELM KAECHELE GmbH ELASTOMERTECHNIK**
ADDRESS OF CONCERN: **Jahnstrase 9**
D-73235 Weilheim/Teck
Federal Republic of Germany

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18 and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled **PULLEY** by inventors **Georg BURKHARDT and Bruno KAECHELE,** described in

( ) the specification filed herewith
(x) application serial no. **PCT/DE99/01078**, filed **April 9, 1999**
( ) patent no. _____ , issued _____

If the rights held by the above-identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed below* and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e). * NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities: (37 CFR 1.27)

NAME: ______________________________

ADDRESS: ______________________________

( ) INDIVIDUAL( ) SMALL BUSINESS CONCERN( ) NONPROFIT CORPORATION

NAME: ______________________________

ADDRESS: ______________________________

( ) INDIVIDUAL( ) SMALL BUSINESS CONCERN( ) NONPROFIT CORPORATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate: (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING: Bruno Kaechele

TITLE OF PERSON OTHER THAN OWNER: President

ADDRESS OF PERSON SIGNING: D 73235 Weilheim/T., Jahnstr. 10

SIGNATURE: [signature] DATE: 4.9.2000

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney Docket No. 077680/0114

In re patent application of

Georg BURKHARDT et al.

Serial No. Unassigned

Filed: Concurrently Herewith

For: PULLEY

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination of the above-identified application, Applicants respectfully request that the following amendments be entered into the application:

IN THE CLAIMS:

Please replace pages 27-33 of the translation (claim pages) with the attached new pages 27-33.

REMARKS

Entry of the foregoing amendments prior to examination is respectfully requested. The amendments to the claims (new pages 27-33) are made to merely correct the numbering of the original claims which were numbered incorrectly in the original application. These pages were submitted in the International Application with a letter dated June 17, 1999.

Respectfully submitted,

October 11, 2000
Date

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Pulley

Pulleys are required for guiding and supporting ropes in aerial tramways for the transport of materials and passengers. As shown by EP-A-0 185 531, such pulleys consist of a basic body which has a wheel hub with which the pulley is mounted so as to be rotatable on a fixed spindle. Emanating from the wheel hub are spokes, which are designed as compression spokes and connect the wheel hub to an outer ring of the basic body. This outer ring forms a cylindrical outer circumferential surface, which is defined in the axial direction and thus laterally by two flange disks. The flange disks are a one-piece component of the outer ring.

A tire made of a hard elastomeric material sits in the slot defined in this way, the outer circumferential surface of which tire forms a rope groove. The inner circumferential surface of this tire is a cylindrical surface and has a slightly larger

diameter than the slot contained in the outer circumference of the outer pulley ring. A further ring, which is to be elastic, sits in this gap.

The radially outer ring of the rope groove is to be sufficiently wear-resistant, whereas the other, radially inner ring is to produce a certain radial resilience.

However, it has been found here that, in such pulleys, the radial resilience is not sufficient to absorb forces which are produced owing to the fact that a clamping socket acting on the rope runs over the pulley.

The clamping sockets, via which the gondolas hanging on the rope are connected to the rope, constitute local thickening from the point of view of the pulley. When they run over the pulley, on account of the thickening, either the load hanging on the rope must be raised accordingly or the pulley must move downward. This results in considerable forces, since the change in the distance between the center of the pulley and the core of the rope must take place relatively quickly. Even if the pulley as a whole is mounted in an elastic manner, the forces are enormous.

A further problem with such pulleys is the flexing work which the elastomeric material is subjected to during the running. At that location at which the rope rests, the elastomeric tire is compressed and, on account of the rotation of the

pulley, this compressed region of the elastomeric tire runs around along the tire, as a result of which flexing work is produced. The flexing work inevitably leads to heating and corresponding wear of the elastomeric tire.

Starting from here, the object of the invention is to provide a pulley which behaves in a more favorable manner with regard to the running quality and the wear.

This object is achieved according to the invention by the pulley having the features of claim 1.

In the pulley according to the invention, the tire sitting on the outer circumferential surface consists of two rings, a radially outer and a radially inner ring. The radially outer ring contains the rope groove and is comparatively hard and wear-resistant.

Suitable materials for the outer ring are plastics and correspondingly hard elastomers.

On the other hand, the radially inner ring is made of a comparatively soft elastomer, which is to have as little damping as possible. When the clamping socket runs over it, the radially inner ring is intended to merely yield in an elastic manner, but is to perform as little damping work as possible.

So that the flexing work, which is achieved by the compression of the radially inner ring, is distributed as far as possible over the entire radially inner ring and is not only effective in a very

pronounced local manner, a reinforcing ring is provided, which is located in the tire. This reinforcing ring may be embedded both between the radially outer ring and the radially inner ring and inside one of the rings.

The reinforcing ring achieves the effect that the outer elastomeric ring largely retains its circular form and is subjected to scarcely any flexing work.

Since a material having little internal damping may be selected for the inner ring, less flexing work is produced and thus less heating is produced during operation of the pulley.

In order to produce the greater softness of the inner elastomeric ring, the inner elastomeric ring may either be made of a softer material or it may be made softer by corresponding bores or chambers which are contained in it.

A further improvement in the running properties is achieved if the tire contains a reinforcing ring. This reinforcing ring ensures that the force originating from the supported rope is distributed uniformly over the inner ring. As a result of the reinforcing ring, the inner ring is not deformed locally in that region which is located directly below the rope supporting point, but rather the deformation extends over the entire circumferential length of the inner ring.

The reinforcing ring may be a plastic molding, a sheet-metal formed part or a metal casting or forging, the plastic molding being somewhat more resilient than the metal part. The selection of the hardness of the plastic molding can determine which circumferential region of the inner elastomeric ring is deformed as a result of the rope supporting force.

The form of the reinforcing ring is advantageously selected in such a way that the radially inner elastomeric ring and/or the radially outer ring has an approximately constant thickness as viewed over its axial length.

In order to make it possible to easily remove the tire from the pulley body without impairing the firm seating of the tire on the pulley body, a clamping device is expediently provided. This clamping device acts essentially in the radial direction.

In the simplest case, the clamping device has an annular, essentially rotationally symmetrical form having a radially inner surface and a radially outer surface. It is either fitted in between the tire and the pulley body or is located virtually inside the tire.

In order to achieve the clamping effect, the clamping device is split in two, the radial pretension force being produced by these parts being clamped together axially, and this pretension force acts

radially inward against the pulley body on the one hand and outward toward the tire on the other hand.

The simplest way to achieve the clamping effect is to split the clamping device into two rings, the thickness of which varies in the axial direction. In the simplest case, each of the rings has an outer frustoconical form and a frustoconical bore, the cones defining these surfaces being in opposition. When the two rings of the clamping device are assembled so as to be facing one another with their thinner end, a constriction is obtained approximately in the center relative to their axial extent. If the tire or the pulley body is designed in a correspondingly complementary manner, a movement of the two rings of the clamping device toward one another produces the desired radial clamping forces relative to one another.

In addition, developments of the invention are the subject matter of the subclaims.

Exemplary embodiments of the subject matter of the invention are shown in the drawing, in which:

Fig. 1 shows a pulley according to the invention in a perspective truncated representation,

Fig. 2 shows the tire of the pulley according to Fig. 1 in an enlarged, truncated, perspective representation,

Figs. 3 and 4 show other exemplary embodiments for the tire of the pulley according to the invention in a cross section, and

Fig. 5 shows a pulley according to the invention with radially acting clamping device, in an exploded representation and in longitudinal section.

A pulley 1 for aerial tramways is illustrated in fig. 1 in a perspective truncated representation.

The pulley 1 has a pulley body 2 and a tire 3 fastened to the latter. The pulley body 2 is a one-piece casting, which forms a central, approximately cylindrical hub 4 with a continuous bearing bore 5. A plurality of spokes 6, which are designed as compression spokes, emanate radially outward from the hub 4 to an outer pulley ring 7, which is connected in one piece with the hub 4 via the compression spokes 6. The pulley ring 7 forms a cylindrical seating face 8 for the tire 3. The cylindrical seating face 8 is concentric to the bearing bore 5.

The pulley ring 7 is defined in the axial direction by two flank faces 9, which are essentially parallel to one another and, starting from the cylindrical seating face 8, extend by a short distance in the radial direction toward the hub 4.

In the exemplary embodiment shown, the flank faces 9 are annular flat faces which are parallel to one another and are at a distance apart corresponding to the axial length of the seating face 8. However, they may also be frustoconical surfaces which are oriented in such a way that the imaginary apex of the

cone lies on the respectively other side of the pulley 1.

In each case a flange disk 12 is fastened to each flank face 9 by means of several screws 11 distributed equidistantly. The two flange disks 12 serve to axially secure the tire 3 and are also intended to additionally secure the rope running over it in order to prevent the latter from falling off at the side.

In a typical pulley, the effective diameter ranges between 100 and 700 mm.

In fig. 2, the tire 3 is shown in a perspective, cut-open, enlarged representation. The axis of rotation of the pulley 1 lies in the section plane.

Relative to the radial direction, the tire 3 is of sandwich-like construction and is essentially formed by three rings 13, 14 and 15 lying concentrically one inside the other. The radially inner ring 13 is made of an elastomeric material having a Shore hardness of between 40 and 75. It is defined by a radially inner cylindrical surface 16, a cylindrical surface 17 pointing radially outward, and two flank faces 18 and 19 lying in the axial direction. In addition, two lateral strips 21 and 22 are integrally formed on the outside of the inner elastomeric ring 13, and these lateral strips 21 and 22 lengthen the two flank faces 18, 19 radially outward by a short

distance. The strips 21 and 22 merge into lips 23 and 24 pointing axially outward. In addition, the ring 13 contains a textile reinforcement (not shown) next to the inner circumferential surface 16.

In the region between the cylindrical surface 16 and the lips 23, 24, the cross section of the inner elastomeric ring 13 is approximately trapezoidal in such a way that the inner elastomeric ring 13 has its greatest axial extent in the region of the cylindrical surface 16. It is slightly narrower at the level of the axially outer cylindrical surface 17.

To improve the heat dissipation and to improve the resilience, the elastomeric ring 13 is provided with a multiplicity of through-openings 25, which are parallel to the axis, are distributed equidistantly along the circumference of the elastomeric ring 13 and lead from the flank face or end face 18 to the flank face or end face 19.

The diameter of the cylindrical surface 16 is just as large as the outside diameter of the seating face 8 or slightly smaller, just sufficient for an interference fit of the tire 3 on the pulley body 3 [sic] to be achieved.

The ring 14, which is slightly further on the outside in the radial direction and adjoins the ring 13, is a reinforcing ring. It consists of a plastic molding, which has the contoured cross-sectional form which can be seen from fig. 2. The cross-sectional form

of the reinforcing ring 14 is constant along the entire circumference.

The reinforcing ring 14 is defined on its radially inner side by a cylindrical surface 26, two side or flank faces 27 and 28, and a radially outer circumferential surface 29. The radially inner circumferential surface 26 is the complementary cylindrical surface to the circumferential surface 17 of the inner ring 13. The flank faces 27 and 28 are provided with a recess in the region of the two lateral strips 21 and 22, whereas above the lips 23 and 24, the distance between the flank faces 27 and 28 is equal to the width of the cylindrical surface 16.

Above the two lips 23 and 24, the flank faces 27 and 28 are annular surfaces parallel to one another, adjoining which, further on the outside in the radial direction, is a further recess having an axial depth corresponding to the recess in the region of the strips 21 and 22.

The outer circumferential surface 29 is a surface of rotation concentric to the axis of rotation and is designed in a groove or channel shape, as can be seen from fig. 2. This results in a groove which runs in the circumferential direction and has a curvature radius corresponding to the distance of this outer circumferential surface 29 from the core of a rope running over the pulley 1.

The reinforcing ring 14 is cohesively connected to the inner elastomeric ring 13 in the region of the circumferential surfaces 17 and 26, in the region of the two strips 21 and 22, and in the region of the lips 23, 24.

The raised lateral strips 21 and 22 are intended to prevent the cohesive connection between the surfaces 17 and 26 from tearing from the flank on account of the flexing movements which occur.

The ring 15, which is furthest on the outside in the radial direction, is likewise an elastomeric ring, which, however, has a greater hardness than the inner elastomeric ring 13. The material of the outer elastomeric ring 15 has a Shore hardness of between 70 and 95.

The outer elastomeric ring 15 is defined radially on the inside by an inner circumferential surface 31, radially on the outside by an outer circumferential surface 32 and laterally by two flank faces 33 and 34. The inner circumferential surface 31 has the same course and the same form as the outer circumferential surface 29 of the reinforcing ring 14.

The two lateral flank faces 33 and 34 merge into two strips 35 and 36, which point radially inward and are formed in the radially outer recess in the flank faces 27 and 28 of the reinforcing ring 14. The two strips 35 and 36 are laterally drawn in slightly, so that a slot 37 which runs in the circumferential

direction is produced in the region of these two strips 35 and 36 on each front face of the tire 3. The slots 37 are open toward the flank of the tire 3.

The outer circumferential surface 32 is provided with a rope groove 38, the radius of curvature of which is approximately equal to the distance between the core of a rope running over it and the outer circumferential surface 32. The rope groove 38 is located centrally between the flank faces 33 and 34.

A small V-shaped slot 39 or 41, respectively, is in each case provided next to both sides of the rope groove 38.

As in the case of the inner elastomeric ring 13, the outer elastomeric ring 15 is also cohesively connected to the reinforcing ring 14. The cohesive connection between the surfaces 31 and 29 is in this case to be protected from tearing by the lateral strips 35 and 36.

The cross-sectional form of the tire 3 and its individual rings 13, 14, 15 forming it is constant along the circumference. The individual interruptions in this course are blind openings 42, which extend from the flanks 27 and 28 into the reinforcing ring 14. These blind openings 42 are intended to reduce the weight of the reinforcing ring 14 and thus help to save material on the one hand and promote the heat dissipation from the interior of the tire 3 on the other hand.

In order to achieve this function, the two flange disks 12, which secure the tire 3 in place on the seating face 8 in the axial direction, contain corresponding openings 43, which as far as possible are in alignment with the blind openings 42 in the assembled state.

In addition, there may also be further through-openings (not shown) in the flange disks 12, these further through-openings being located at a level corresponding to the through-openings 45 [sic].

To assemble the tire shown in fig. 2, first of all one of the two flange disks 12 is screwed to the pulley body 2 by means of the fastening screws 11. The tire 3 is then pulled onto the seating face 8 in the axial direction until it bears with the flank faces 27 or 28 against the inside of the fastened flange disk 12. The second flange disk 12 is then mounted and fastened with the screws 11.

If a suspension rope of an aerial tramway for the conveyance of passengers or materials runs over the pulley 1 designed in this way, the rope is directly in contact with the outer elastomeric ring 15. Since this ring 15 is made of a comparatively hard elastomer, good abrasive resistance is achieved, whereas, on the other hand, the generation of noise is slight.

Due to the weight of the rope running over it, with the gondolas hanging thereon, the outer

elastomeric ring 15 will be deformed to a comparatively small extent on account of its considerable hardness.

On the other hand, the inner elastomeric ring 13 is substantially softer, for which reason it will be deformed, although not only locally, but over its entire circumferential region. The reinforcing ring 14 contained between the two elastomeric rings 13 and 15 distributes the force originating from the weight of the rope in such a way that the reinforcing ring 14 becomes slightly eccentric relative to the seating face 8. Directly below the rope supporting point, the inner elastomeric ring 13 is compressed, whereas it is stressed in tension at the location diametrically opposite this point relative to the axis of rotation. On the other hand, at two locations which are rotated exactly through 90° therefrom, only a shearing stress occurs in the elastomeric ring 13. Depending on which direction a shearing stress progresses starting from this location, the shearing stress decreases and turns into a compressive stress or changes to a tensile stress. In this way, the flexing stress of the tire 3 which occurs when the rope runs over it is uniformly distributed over the entire circumference of the inner ring 13. Consequently, the inner ring 13 may be made of a comparatively very soft elastomeric material, since the rope pressure is directed into the rigid pulley body 2 over a relatively large area.

The soft elastomeric material may be provided with very little internal damping, whereby the work occurring due to the flexing is kept small and the inner elastomeric ring 13 heats up only slightly as a result of the flexing.

When the clamping socket, via which the stem of the gondola is connected to the rope, runs over the pulley 1 described, a force directed downward is briefly produced on account of the apparent rope thickening. The relatively soft inner elastomeric ring 13 can readily yield to the thickening.

Since elastomers are known to be incompressible, a corresponding cross-sectional change is produced by the deformation as a result of the rope force. So that this cross-sectional change can actually occur and is not blocked by the two flange disks 12, the two flanks 18 and 19 of the inner elastomeric ring 13 run toward one another. This results in a wedge-shaped gap in each case relative to the two flange disks 12, said wedge-shaped gap being filled during the local compression of the elastomeric ring 13.

The lateral grooves 37 and the V-shaped slots 39 and 41 contained on the top side have a similar function.

In order to vary the compliance, damping and abrasion behavior, the inner and/or outer elastomeric ring 13, 15, if need be, may contain textile inlays of metallic filaments, plastic or natural fibers. In

addition, a textile inlay in the inner ring 13 can improve the friction grip between the tire 3 and the pulley body 2.

In the exemplary embodiment according to fig. 2, the reinforcing ring 14 is a plastic molding, if need be fiber-reinforced. If this strength is not sufficient in order to adequately distribute the loading over the circumference of the inner ring 13, a reinforcing ring 14, as shown in fig. 3, may also be used. This reinforcing ring 14 consists of two ring halves 14a and 14b, which have the same form and are arranged the opposite way round from one another. The reinforcing ring 14 obtained in this way has essentially the same outer contour as the reinforcing ring 14 according to fig. 2, i.e. it forms a radial [sic] inner circumferential surface 26 which is continuous throughout and a radially outer circumferential surface 29 which follows the course of the rope groove 38. The difference in the outer contour consists essentially in the recesses, which in a sheet-metal formed part can be designed with flanks which are not so steep.

The ring half 14a, in the same way as the ring half 14b, is a sheet-metal formed part of U-shaped cross section having an essentially straight leg 45, which is bent inward at its outer end at 46. The sheet-metal formed part merges at 47 into a flat back 48, which in the assembled state runs parallel to a plane

perpendicular to the axis of rotation. This is followed in turn at 49 by a leg 51 which runs outward and is designed in such a way that the desired outer form is obtained.

In order to obtain the complete ring 14, the two ring halves 14a and 14b are arranged so as to bear against one another with their two backs 48 and, for example along the two fillets resulting from this, are welded to one another at 52 and 53.

Since the construction is otherwise the same as in the exemplary embodiment according to fig. 2, the remaining components do not need to be explained further.

Shown in fig. 4 is an exemplary embodiment in which the reinforcing ring 14 again consists of two halves 14a and 14b produced as a sheet-metal formed part. These two halves 14a and 14b have a U-shaped form as viewed in cross section and are identical to one another. The essential difference from the embodiment according to fig. 3 consists in the fact that the axial depth of the sheet-metal formed parts is slightly smaller, so that, as can be seen in fig. 4, the two backs 48 are at a distance from one another.

In order to fasten them to one another, the backs 48 contain holes 55 which are uniformly spaced apart along the circumference and through which cylindrical rivets 56 pass, which are riveted inside the respective profile while forming a closing head 57.

As a result, it becomes possible, during the production of the outer elastomeric ring 15, to allow its material to pass radially inward through the gap between the two halves of the reinforcing ring 14. The reinforcing ring 14 therefore no longer forms a boundary between the elastomeric outer ring 15 and the elastomeric inner ring 13. On the contrary, in the exemplary embodiment according to fig. 4, it is embedded in the outer elastomeric ring 15. The two elastomeric rings 14 and 15 meet one another directly at a boundary layer 58. This boundary layer has the form of a double cone with the orientation as follows from fig. 4, i.e. the thickness of the inner elastomeric ring 15 is smallest at the center between the two flange disks 12.

At the boundary layer 58, the two rings 13 and 15 may either be cohesively connected to one another or are produced separately from one another in order to be fitted into one another subsequently.

Otherwise, the design of the tire 3 according to fig. 4 corresponds to the design of the tire 3 according to fig. 2.

It goes without saying that the reinforcing ring 14 may also be embodied as a metal casting or forging or may be assembled from such parts.

Fig. 5 shows another exemplary embodiment of the pulley 1 according to the invention. The essential difference from the previous exemplary embodiments

consists in the use of an additional clamping device 61.

Whereas in the previous exemplary embodiments the pulley body 2 has the form of a spoked wheel, it is designed as a disk wheel in the exemplary embodiment according to fig. 5.

The seating face 8 for the tire 3 starts at one of the front faces of the seating face 8 [sic] with a short cylindrical section 62, which contains a snap-ring groove 63. Adjoining the cylindrical section 62 is a frustoconical surface 64, which is oriented in such a way that the diameter increases continuously from the cylindrical section 62 in the direction of the opposite front face of the pulley body 2. The largest diameter, relative to the axial extent of the pulley body 2, is reached approximately at the center of the latter at a plane of symmetry 65. A second frustoconical surface 66 starts at this location, but with the opposite orientation, i.e. the diameter tapers starting from the plane of symmetry 65. Finally, the frustoconical surface 66 merges into a further cylindrical surface 67, which likewise contains a snap-ring groove 68. The diameter of the two cylindrical surfaces 62 and 67 is identical. The outer circumferential surface or the seating face 8, relative to the axis of rotation, is rotationally symmetrical, but no longer cylindrical as in the previous exemplary embodiments.

As before, the radially outer ring 15 and the reinforcing ring 14 belong to the tire 3.

The radially outer ring 15 is relatively thin-walled and contains the rope groove 38 in its outer side. The radially outer ring 15 is made of a rigid plastic or an elastomer having a Shore hardness of between 80 and 100.

In contrast to the previous exemplary embodiment, the reinforcing ring 14, which is cohesively connected to the radially outer ring 15, for example by vulcanizing, is comparatively thin-walled, relative to the radial direction. It is made of a similar material as explained in connection with the previous exemplary embodiments. Its bore, unlike the previous exemplary embodiment, is not a cylindrical bore, but has the form of a double conical frustum, consisting of two frustoconical surfaces 69 and 68, which are oriented in such a way that, relative to the axial extent, a constriction is obtained in the center of the reinforcing ring 14. The angular areas of the conical surfaces 68 and 69 are complementary to the conical surfaces 64 and 66 as formed on the pulley body 2.

The diameter of the two frustoconical surfaces 68 and 69, as fig. 5 shows, is markedly larger than the diameter of the two frustoconical surfaces 64 and 66. In this way, an annular gap, which is defined

by a total of four conical surfaces, is obtained between the reinforcing ring 14 and the seating face 8.

The radially inner ring, which was unsplit in the previous exemplary embodiments, is composed of two sections 13a and 13b in the exemplary embodiment according to fig. 5. The two sections 13a and 13b are in mirror symmetry relative to one another and are in each case the generated surface of conical frustums. Their axial extent is approximately equal to the length of the conical generated surface 68 or 69 respectively.

The clamping device 61 comprises two clamping rings 71 and 72, which are essentially in mirror symmetry relative to one another. The clamping ring 71 is defined in the radial direction by two frustoconical surfaces 73 and 74, which are oriented in such a way that they converge in the direction of the plane of symmetry 65. Extending between the two frustoconical surfaces 73 and 74 are two end faces 75 and 76. These end faces 75 and 76 are flat faces in the broadest sense, the end face 75 facing the plane of symmetry 65. The material of the clamping ring 71 is, for example, steel.

The part 13b of the radially inner ring is vulcanized in place on the frustoconical surface 74. The cone angle of the frustoconical surface 74 is selected in such a way that the frustoconical surface 74 runs parallel to the frustoconical surface 68. The

same correspondingly applies to the frustoconical surface 73 relative to the frustoconical surface 66.

In order to achieve as good an elastic action as possible, a further elastomeric ring 77 is vulcanized in place on the radially inner frustoconical surface 73, said elastomeric ring 77 being made of the same material as the radially inner ring 13b. Its free surface 78 is in turn a frustoconical surface, which runs parallel to the frustoconical surface 66.

Parallel to the axis of the pulley body 3, the clamping ring 71 alternately has tapped holes 79 and stepped holes 81.

The clamping ring 72 has essentially the same form as the clamping ring 71, for which reason the structural elements there are provided with the same reference numerals as the structural elements of the clamping ring 71. The clamping ring 72 also bears an additional elastomeric coating 77 on its inside, which circumscribes a frustoconical bore 78. However, instead of the tapped holes 79, the clamping ring 72 contains stepped holes 82, which serve to receive fastening screws 83.

Finally, two identical flange disks 84, which are designed as flat disks, complete the construction of the pulley 1, the bore 85 of said flange disks 84 having a diameter corresponding to the outside diameter of the two cylindrical sections 62 and 67. The bore 85 is defined toward the outside by a bevel surface 86, in

which a snap ring 87 finds space in the assembled state when it is inserted into the snap-ring groove 63 or 68.

The pulley 1 according to the invention is assembled as follows:

First of all the clamping ring 71 with the radially outer ring 13b vulcanized in place and the elastomeric coating 77 is put onto the pulley body 3 from the left-hand side. The left-hand flange disk 84 is then put on and the left-hand snap ring 87 is snapped into the snap-ring groove 68. The unit consisting of the reinforcing ring 14 and the radially outer ring 15 can now be slipped on from the right without the clamping ring 71 being able to give way to the side. The right-hand clamping ring 72 is then likewise put onto the pulley body 3 from the right. Once the arrangement has been prepared to this extent, the clamping rings 71 and 72 are rotated relative to one another until each tapped hole 79 is opposite a stepped hole 82. Screws 83 are then screwed into each combination of tapped hole 79 and stepped hole 82 and tightened one after the other. As a result of the frustoconical form of the two clamping rings 71 and 72 in combination with the frustoconical surfaces 64, 66, 68, 69, a radial clamping force is produced when the two clamping rings 71 and 72 are being screwed together, and this radial clamping force is directed, on the one hand, radially inward against the two frustoconical surfaces 64 and 66 and, on the other

hand, radially outward against the two frustoconical surfaces 68 and 69. The clamping rings 71 and 72 act like annular wedges, which are pressed between the conical surfaces 66, 68 and 62, 69 respectively.

Finally, the right-hand flange disk 84 is put on and secured by means of the right-hand snap ring 87 snapped into the snap-ring groove 63. The pulley 1 is thus completely assembled.

The pretension, with which the two sections 13a and 13b of the radially inner ring, or the elastomeric coatings 77 on the inside of the two clamping rings 71 and 72 are pretensioned, can be regulated by more or less pronounced tightening of the screws 83. The materials for the sections 13a and 13b of the radially inner ring are expediently the same as for the elastomeric coatings 77 and they also have the same wall thickness. In this way, the elastomeric coatings 77 also have an elastic action when a clamping socket runs over the pulley and attempts to push away the outer circumferential surface of the tire radially relative to the hub 5.

The pretension, caused by the clamping rings 71 and 72, in the radially inner ring 13a or 13b and in the elastomeric coating 77 acts in such a way that said radially inner ring 13a or 13b and said elastomeric coating 77 are not deformed further until after a certain radial force, determined by the pretension, is exceeded. However, the further deformation takes place

with the same hardness or softness, as if there were no additional pretension. In this way, the flexing work can be reduced when, for example, only the empty rope runs over the pulley 1. Deformation of the radially inner ring 13a or 13b or of the elastomeric coatings 77 and consequently also flexing work result only when greater forces occur.

As a result of the radial pretension, the reinforcing ring 14, together with the radially outer ring firmly vulcanized on it, is reliably held in place on the seat 8 in a frictional manner. If the friction grip is not sufficient, it is also possible to cohesively connect the coating 77 to the frustoconical surface 64 or 66 during assembly, for example if an adhesive is introduced during assembly or if the boundary surface is subsequently vulcanized after assembly. The same can be done between the frustoconical surface 68 or 69 and the outside of the radially inner ring 13a or 13b.

Conversely, as follows from the explanation of the assembly, dismantling is readily possible in a simple manner by the abovementioned manipulations being carried out in the reverse sequence. In this way, the tire 3, which is subject to wear, and/or the clamping rings 71, 72 can be exchanged even when a pulley is mounted on a mast.

A pulley consists of a pulley basic body which has a cylindrical outer circumferential surface.

Sitting on this cylindrical outer circumferential surface is a tire, which is of sandwich-like design with regard to its radial extent. This results in a plurality of rings concentric to one another. The ring which is furthest on the inside in the radial direction and the ring which is furthest on the outside in the radial direction is [sic] in each case an elastomeric ring [sic], whereas a reinforcing ring is located between them. The elastomeric outer ring is harder than the elastomeric inner ring, so that a very abrasion-resistant surface is achieved, over which the rope runs, whereas the elastomeric inner ring provides for adequate resilience. The reinforcing ring is provided in order to distribute the rope load as uniformly as possible over the elastomeric inner ring.

Claims:

1. A pulley (1), in particular for aerial tramways, having a pulley body (2) which has a rotationally symmetrical outer circumferential surface (8) and a pulley hub (4), and having a tire (3) which sits on the outer circumferential surface (8) and has at least one radially outer and one radially inner ring (13, 15) and also a reinforcing ring (14), the reinforcing ring being made of a material which is rigid relative to the radially inner and the radially outer rings (13, 15), the reinforcing ring having a diameter which is smaller than the outside diameter of the radially outer ring (15), the radially inner ring (13) being made of an elastomer, the radially outer ring (15) being made of an elastomer or a plastic, and the radially outer ring (15) having a greater Shore hardness than the radially inner ring (13).

2. The pulley as claimed in claim 1, characterized in that the pulley body (2) has two lateral flanks (9), between which the outer circumferential surface (8) of the pulley body (2) extends and into which the outer circumferential surface (8) of the pulley body (2) merges.

3. The pulley as claimed in claim 2, characterized in that at least one of the lateral flanks (9) is flat or frustoconical, and in that a flange disk (12), which projects radially outward beyond the outer

circumferential surface (8) of the pulley body (2), is detachably fastened to at least one of the lateral flanks (9).

4. The pulley as claimed in claim 1, characterized in that the width of the outer circumferential surface (8) of the pulley body (2) corresponds to the width of the radially inner and the radially outer rings (13, 15).

5. The pulley as claimed in claim 1, characterized in that the radially inner and the radially outer rings (13, 15) are approximately the same width.

6. The pulley as claimed in claim 1, characterized in that the radially outer ring (15) has an outer circumferential surface (32) which is a surface of rotation and which is concentric to the pulley hub (4) in the unloaded state.

7. The pulley as claimed in claim 1, characterized in that the outer circumferential surface (32) of the radially outer ring (15) contains a rope groove (38).

8. The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) is embedded in the radially outer or the radially inner ring (15).

9. The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) is fitted in between the radially outer ring or [sic] the radially inner ring (15).

10. The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) is a plastic molding which, if need be, is fiber-reinforced.

13. [sic] The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) has [sic] a sheet-metal formed part.

11. [sic] The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) has [sic] a forging.

12. [sic] The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) has [sic] a casting.

13. [sic] The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) has an outer circumferential surface (29) which is designed in such a way that the radially outer ring (15) has an approximately constant thickness as viewed over its width.

14. [sic] The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) has an inner circumferential surface (26) which is designed in such a way that the radially inner ring (13) has an approximately constant thickness as viewed over its width.

15. [sic] The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) consists of two parts (14a, 14b) which are joined together along a radial plane and are fastened to one another.

16. [sic] The pulley as claimed in claim 15, characterized in that the two parts (14a, 14b) of the

reinforcing ring (14) bear directly against one another.

17. [sic] The pulley as claimed in claim 15, characterized in that the two parts (14a, 14b) of the reinforcing ring (14) are connected to one another while forming at least one axial intermediate space.

18. [sic] The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) contains blind openings (42) which lead from the lateral flank (27, 28) into the reinforcing ring (14).

19. [sic] The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) contains slots which run in the circumferential direction and lead from the lateral flank (27, 28) into the reinforcing ring (14).

20. [sic] The pulley as claimed in claim 1, characterized in that at least either the radially outer or the radially inner ring (13, 15) is connected to the reinforcing ring (14) in a positive-locking manner.

21. [sic] The pulley as claimed in claim 1, characterized in that the radially inner ring (13) is recessed at its lateral flanks (17, 18) at least in sections relative to the surfaces defined by the lateral flanks (9) of the pulley body (2).

22. [sic] The pulley as claimed in claim 1, characterized in that the radially inner ring (13) contains a plurality of through-openings (25), which

run in the axial direction and are distributed equidistantly along the circumference.

23. [sic] The pulley as claimed in claim 1, characterized in that the radially inner ring (13) has little internal damping.

24. [sic] The pulley as claimed in claim 1, characterized in that the distance between the lateral flanks (33, 34) of the radially outer ring (15) is equal to the clearance distance between the flange disks (12) at this location.

25. [sic] The pulley as claimed in claim 1, characterized in that at least the radially inner ring (13) contains a textile reinforcement in the vicinity of its inner circumferential surface (16).

26. [sic] The pulley as claimed in claim 1, characterized in that a clamping device (61) is assigned to the tire (3), by means of which clamping device (61) the tire (3) can be radially pretensioned on the outer circumferential surface (8) of the pulley body (3) [sic].

27. [sic] The pulley as claimed in claim 26, characterized in that the clamping device (61) has an annular, essentially rotationally symmetrical form with a radially inner and a radially outer surface (73, 74).

28. [sic] The pulley as claimed in claim 26, characterized in that the clamping device (61), relative to the radial direction, is fitted in between the radially inner ring (13) and the outer

circumferential surface (8) of the pulley body (3) [sic].

29. [sic] The pulley as claimed in claim 26, characterized in that the clamping device (61), relative to the radial direction, is fitted in between the radially inner ring (13) and the reinforcing ring (14).

30. [sic] The pulley as claimed in claim 26, characterized in that the clamping device (61), relative to the axial direction of the pulley body (3), is split into two parts (71, 72).

31. [sic] The pulley as claimed in claim 30, characterized in that the radially inner ring (13), relative to the axial direction of the pulley body (3) [sic], is split into two parts (13a, 13b), and in that in each case one part (13a, 13b) of the radially inner ring (13) sits on the corresponding part (71, 72) of the clamping device (61).

32. [sic] The pulley as claimed in claim 26, characterized in that the clamping device (61) bears an elastomeric coating (77) on its radially inner surface (73), said elastomeric coating (77) being cohesively connected to the clamping device (61).

33. [sic] The pulley as claimed in claim 32, characterized in that the elastomeric coating (77) is made of the same material as the radially inner ring (13).

34. [sic] The pulley as claimed in claim 26, characterized in that each annular part (71, 72) of the clamping device (61) has a frustoconical outer form and a frustoconical bore (73), the radial thickness at one axial end (75) of each annular part (71, 72) being smaller than at the other axial end (76), and in that a ring is obtained in the assembled state, which ring, relative to its axial extent, is constricted approximately in the center.

35. [sic] The pulley as claimed in claim 26, characterized in that the two parts (71 [lacuna]) are screwed together by means of screws (83).

36. [sic] The pulley as claimed in claim 1, characterized in that the outer circumferential surface (8) of the pulley body (3) [sic] forms a double cone, which has the largest diameter at the intersection (65) between the two cones.

37. [sic] The pulley as claimed in claim 1, characterized in that the outer circumferential surface (8) of the pulley body (3) [sic] forms a cylindrical surface.

Claims:

1. A pulley (1), in particular for aerial tramways, having a pulley body (2) which has a rotationally symmetrical outer circumferential surface (8) and a pulley hub (4), and having a tire (3) which sits on the outer circumferential surface (8) and has at least one radially outer and one radially inner ring (13, 15) and also a reinforcing ring (14), the reinforcing ring being made of a material which is rigid relative to the radially inner and the radially outer rings (13, 15), the reinforcing ring having a diameter which is smaller than the outside diameter of the radially outer ring (15), the radially inner ring (13) being made of an elastomer, the radially outer ring (15) being made of an elastomer or a plastic, and the radially outer ring (15) having a greater Shore hardness than the radially inner ring (13).

2. The pulley as claimed in claim 1, characterized in that the pulley body (2) has two lateral flanks (9), between which the outer circumferential surface (8) of the pulley body (2) extends and into which the outer circumferential surface (8) of the pulley body (2) merges.

3. The pulley as claimed in claim 2, characterized in that at least one of the lateral flanks (9) is flat or frustoconical, and in that a flange disk (12), which projects radially outward beyond the outer circumferential surface (8) of the pulley body (2), is

detachably fastened to at least one of the lateral flanks (9).

4. The pulley as claimed in claim 1, characterized in that the width of the outer circumferential surface (8) of the pulley body (2) corresponds to the width of the radially inner and the radially outer rings (13, 15).

5. The pulley as claimed in claim 1, characterized in that the radially inner and the radially outer rings (13, 15) are approximately the same width.

6. The pulley as claimed in claim 1, characterized in that the radially outer ring (15) has an outer circumferential surface (32) which is a surface of rotation and which is concentric to the pulley hub (4) in the unloaded state.

7. The pulley as claimed in claim 1, characterized in that the outer circumferential surface (32) of the radially outer ring (15) contains a rope groove (38).

8. The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) is embedded in the radially outer or the radially inner ring (15).

9. The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) is fitted in between the radially outer or [sic] the radially inner ring (15).

10. The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) is a plastic molding which, if need be, is fiber-reinforced.

11. The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) has [sic] a sheet-metal formed part.

12. The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) has [sic] a forging.

13. The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) has [sic] a casting.

14. The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) has an outer circumferential surface (29) which is designed in such a way that the radially outer ring (15) has an approximately constant thickness as viewed over its width.

15. The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) has an inner circumferential surface (26) which is designed in such a way that the radially inner ring (13) has an approximately constant thickness as viewed over its width.

16. The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) consists of two parts (14a, 14b) which are joined together along a radial plane and are fastened to one another.

17. The pulley as claimed in claim 15, characterized in that the two parts (14a, 14b) of the reinforcing ring (14) bear directly against one another.

18. The pulley as claimed in claim 15, characterized in that the two parts (14a, 14b) of the reinforcing ring (14) are connected to one another while forming at least one axial intermediate space.

19. The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) contains blind openings

(42) which lead from the lateral flank (27, 28) into the reinforcing ring (14).

20. The pulley as claimed in claim 1, characterized in that the reinforcing ring (14) contains slots which run in the circumferential direction and lead from the lateral flank (27, 28) into the reinforcing ring (14).

21. The pulley as claimed in claim 1, characterized in that at least either the radially outer or the radially inner ring (13, 15) is connected to the reinforcing ring (14) in a positive-locking manner.

22. The pulley as claimed in claim 1, characterized in that the radially inner ring (13) is recessed at its lateral flanks (17, 18) at least in sections relative to the surfaces defined by the lateral flanks (9) of the pulley body (2).

23. The pulley as claimed in claim 1, characterized in that the radially inner ring (13) contains a plurality of through-openings (25), which run in the axial direction and are distributed equidistantly along the circumference.

24. The pulley as claimed in claim 1, characterized in that the radially inner ring (13) has little internal damping.

25. The pulley as claimed in claim 1, characterized in that the distance between the lateral flanks (33, 34) of the radially outer ring (15) is equal to the clearance distance between the flange disks (12) at this location.

26. The pulley as claimed in claim 1, characterized in that at least the radially inner ring (13) contains a textile reinforcement in the vicinity of its inner circumferential surface (16).

27. The pulley as claimed in claim 1, characterized in that a clamping device (61) is assigned to the tire (3), by means of which clamping device (61) the tire (3) can be radially pretensioned on the outer circumferential surface (8) of the pulley body (3) [sic].

28. The pulley as claimed in claim 26, characterized in that the clamping device (61) has an annular, essentially rotationally symmetrical form with a radially inner and a radially outer surface (73. 74).

29. The pulley as claimed in claim 26, characterized in that the clamping device (61), relative to the radial direction, is fitted in between the radially inner ring (13) and the outer circumferential surface (8) of the pulley body (3) [sic].

30. The pulley as claimed in claim 26, characterized in that the clamping device (61), relative to the radial direction, is fitted in between the radially inner ring (13) and the reinforcing ring (14).

31. The pulley as claimed in claim 26, characterized in that the clamping device (61), relative to the axial direction of the pulley body (3), is split into two parts (71, 72).

32. The pulley as claimed in claim 30, characterized in that the radially inner ring (13), relative to the

axial direction of the pulley body (3) [sic], is split into two parts (13a, 13b), and in that in each case one part (13a, 13b) of the radially inner ring (13) sits on the corresponding part (71, 72) of the clamping device (61).

33. The pulley as claimed in claim 26, characterized in that the clamping device (61) bears an elastomeric coating (77) on its radially inner surface (73), said elastomeric coating (77) being cohesively connected to the clamping device (61).

34. The pulley as claimed in claim 32, characterized in that the elastomeric coating (77) is made of the same material as the radially inner ring (13).

35. The pulley as claimed in claim 26, characterized in that each annular part (71, 72) of the clamping device (61) has a frustoconical outer form and a frustoconical bore (73), the radial thickness at one axial end (75) of each annular part (71, 72) being smaller than at the other axial end (76), and in that a ring is obtained in the assembled state, which ring, relative to its axial extent, is constricted approximately in the center.

36. The pulley as claimed in claim 26, characterized in that the two parts (71 [lacuna]) are screwed together by means of screws (83).

37. The pulley as claimed in claim 1, characterized in that the outer circumferential surface (8) of the pulley body (3) [sic] forms a double cone, which has

the largest diameter at the intersection (65) between the two cones.

38. The pulley as claimed in claim 1, characterized in that the outer circumferential surface (8) of the pulley body (3) [sic] forms a cylindrical surface.

Abstract:

A pulley (1) consists of a pulley basic body (3) [sic] which has a cylindrical outer circumferential surface (8). Sitting on this cylindrical outer circumferential surface (8) is a tire (3), which is of sandwich-like design with regard to its radial extent. This results in a plurality of rings (13, 14, 15) concentric to one another. The ring (13) which is furthest on the inside in the radial direction and the ring (15) which is furthest on the outside in the radial direction are in each case elastomeric rings, whereas a reinforcing ring (14) is located between them. The elastomeric outer ring (15) is harder than the elastomeric inner ring (13), so that a very abrasion-resistant surface is achieved, over which the rope runs, whereas the elastomeric inner ring (13) provides for adequate resilience. The reinforcing ring (14) is provided in order to distribute the rope load as uniformly as possible over the elastomeric inner ring (13).

Fig. 2

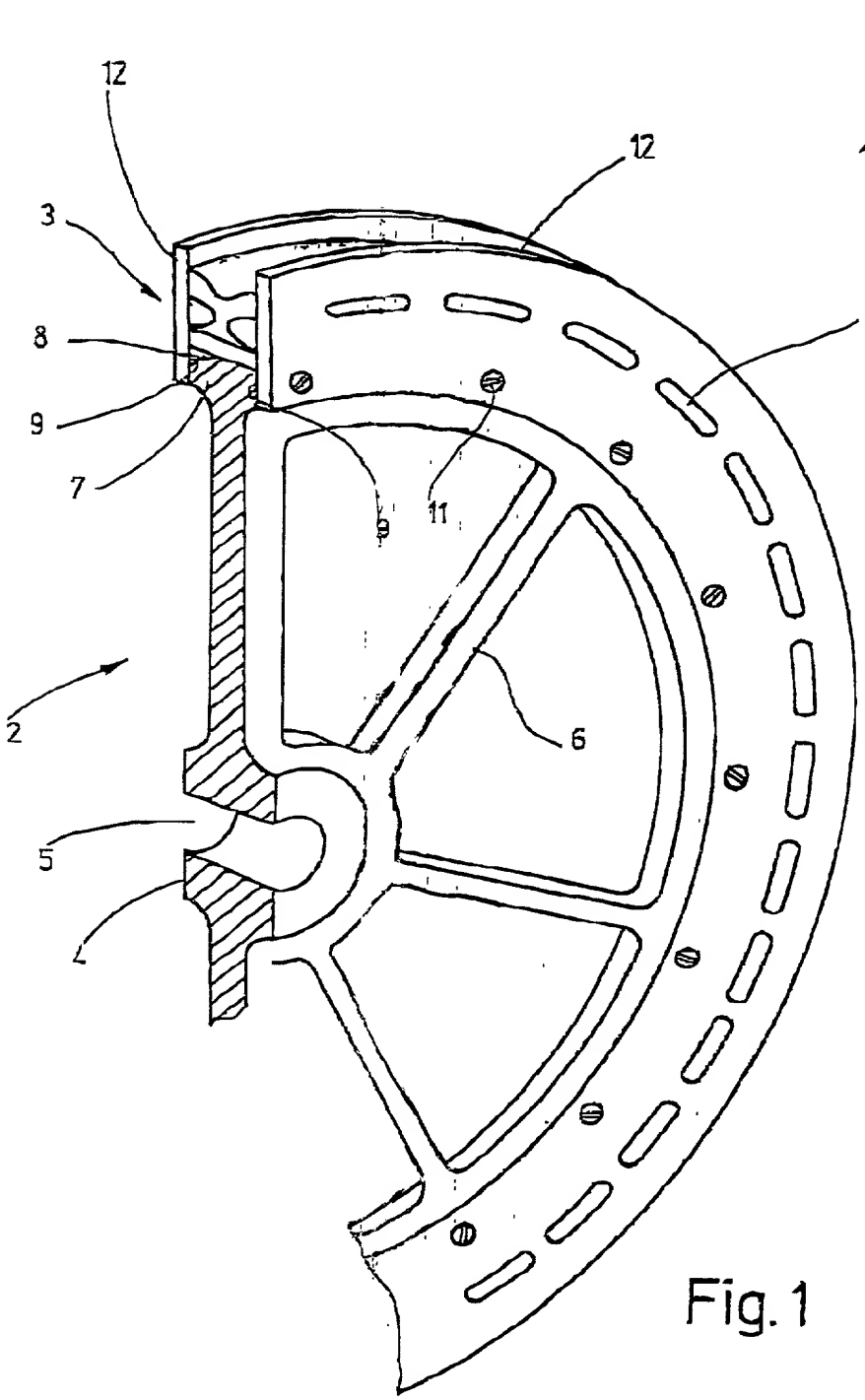

Fig. 1

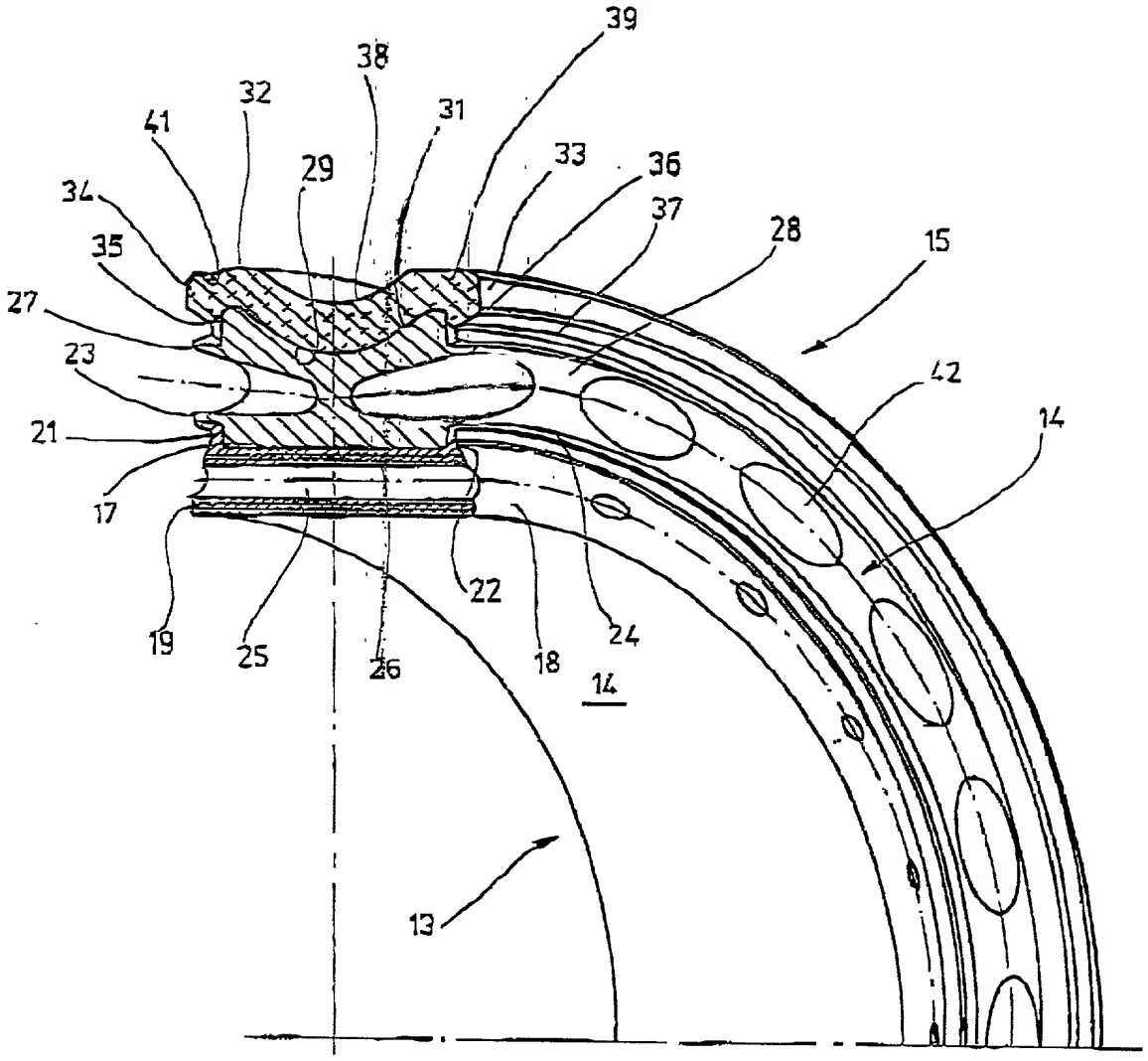
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Fig. 2

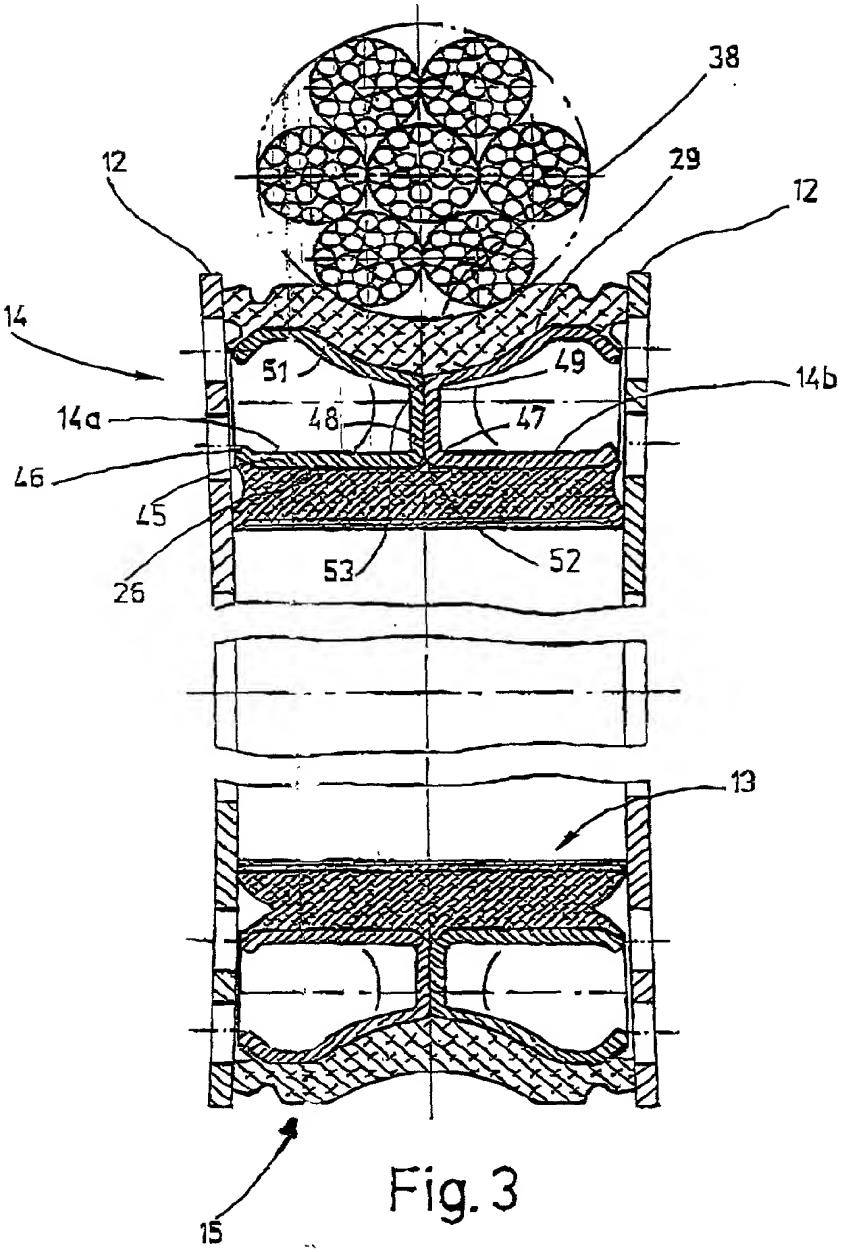


Fig. 3

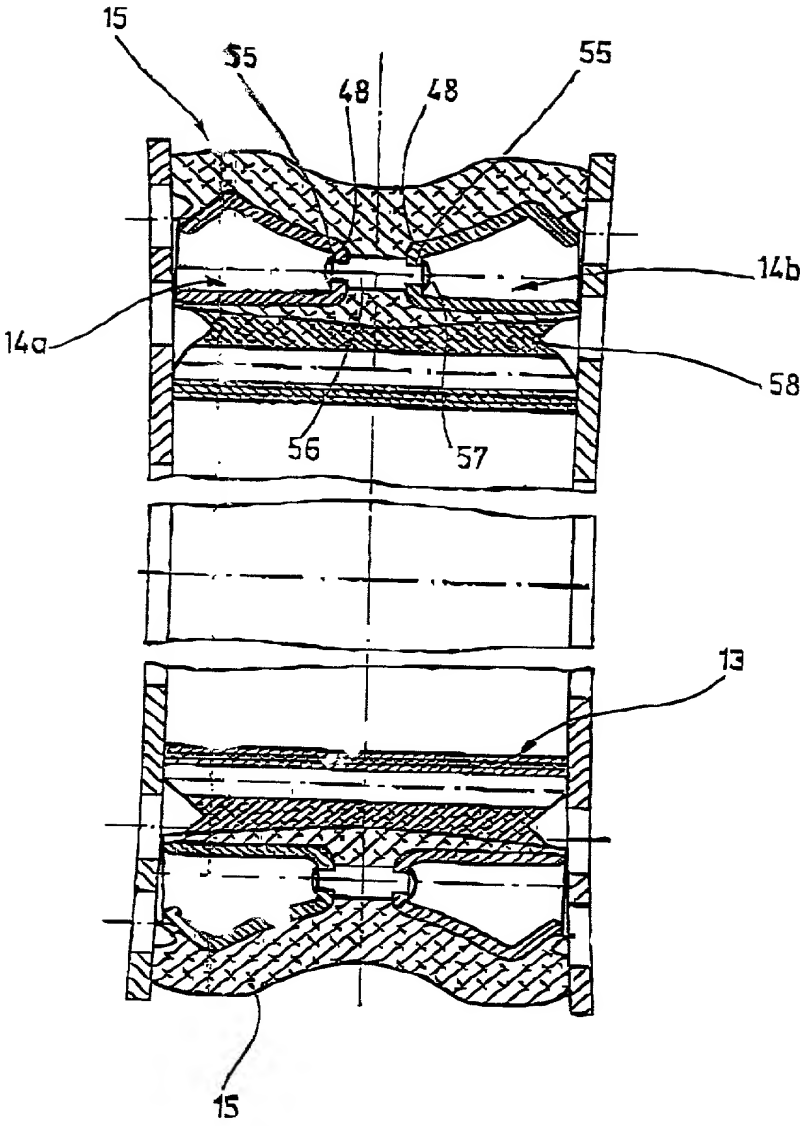
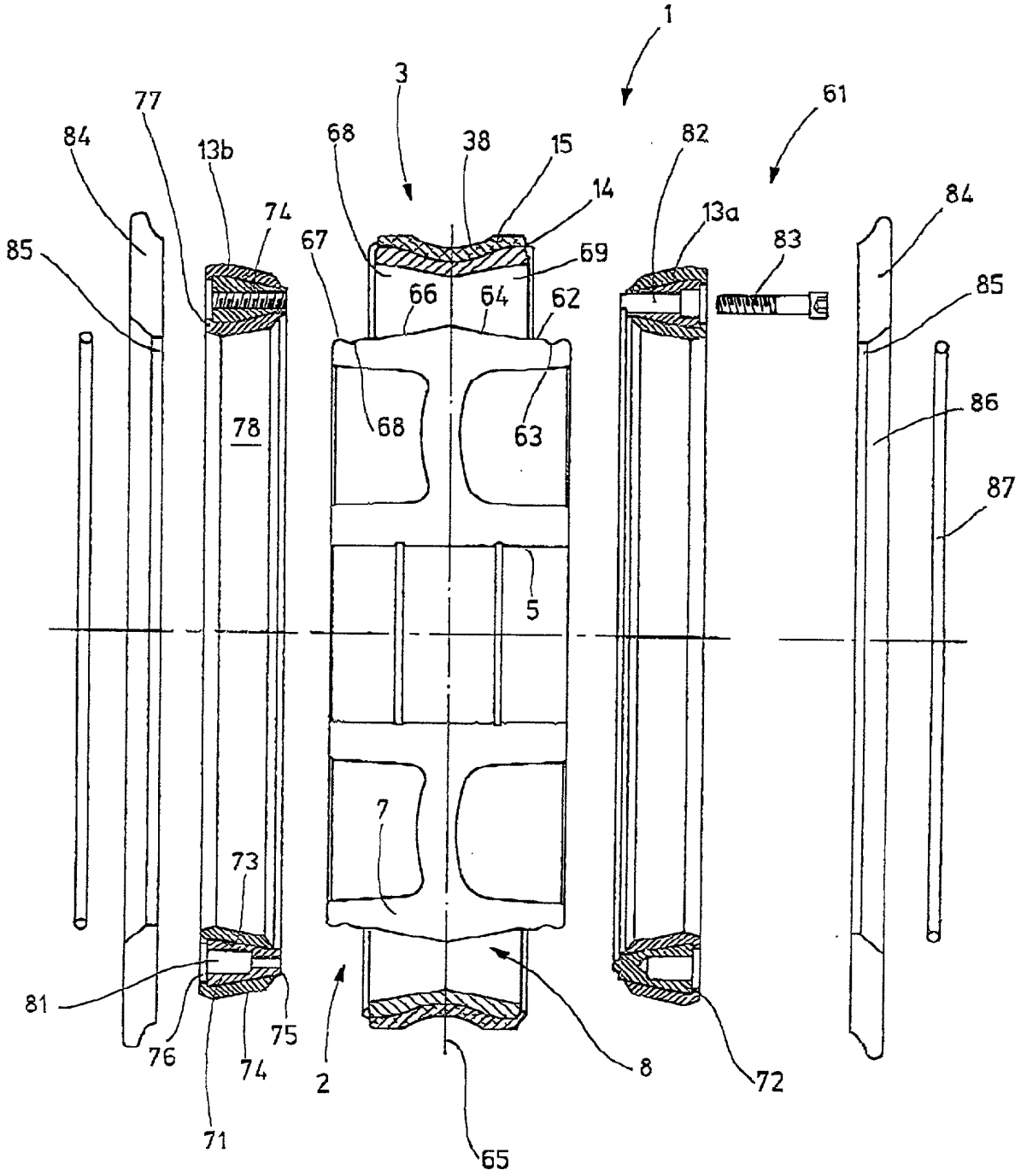


Fig. 4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64
62
85
86
78
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81
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74
75
2
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72
71
65

Fig. 5

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I HEREBY DECLARE:

THAT my residence, post office address, and citizenship are as stated below next to my name;

THAT I believe I am the original, first, and sole inventor (if only one inventor is named below) or an original, first, and joint inventor (if plural inventors are named below or in an attached Declaration) of the subject matter which is claimed and for which a patent is sought on the invention entitled

PULLEY

(Attorney Docket No. 077680/0114)

the specification of which (check one)

___ is attached hereto.

_X_ was filed on April 9, 1999 as United States Application Number or PCT International Application Number PCT/DE99/01078 and was amended on _____ (if applicable).

THAT I do not know and do not believe that the same invention was ever known or used by others in the United States of America, or was patented or described in any printed publication in any country, before I (we) invented it;

THAT I do not know and do not believe that the same invention was patented or described in any printed publication in any country, or in public use or on sale in the United States of America, for more than one year prior to the filing date of this United States application;

THAT I do not know and do not believe that the same invention was first patented or made the subject of an inventor's certificate that issued in any country foreign to the United States of America before the filing date of this United States application if the foreign application was filed by me (us), or by my (our) legal representatives or assigns, more than twelve months (six months for design patents) prior to the filing date of this United States application;

THAT I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment specifically referred to above;

THAT I believe that the above-identified specification contains a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention, and sets forth the best mode contemplated by me of carrying out the invention; and

THAT I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I HEREBY CLAIM foreign priority benefits under Title 35, United States Code §119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below any foreign application for patent or inventor's certificate or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number	Country	Foreign Filing Date	Priority Claimed?	Certified Copy Attached?
198 16 327 4	FEDERAL REPUBLIC OF GERMANY	11 April 1998	YES	

I HEREBY CLAIM the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below.

U.S. Provisional Application Number	Filing Date

I HEREBY CLAIM the benefit under Title 35, United States Code, §120 of any United States application(s), or § 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application Number	PCT Parent Application Number	Parent Filing Date	Parent Patent Number

I HEREBY APPOINT the following registered attorneys and agents of the law firm of FOLEY & LARDNER to have full power to prosecute this application and any continuations, divisions, reissues, and reexaminations thereof, to receive the patent, and to transact all business in the United States Patent and Trademark Office connected therewith:

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I UNDERSTAND AND AGREE THAT the foregoing attorneys and agents appointed by me to prosecute this application do not personally represent me or my legal interests, but instead represent the interests of the legal owner(s) of the invention described in this application.

I FURTHER DECLARE THAT all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

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